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Clinical Overview

An overview of smell and taste problems in paediatric COVID-19 patients

Short title: COVID-19 taste and smell symptoms

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ABSTRACT

At the start of the COVID-19 pandemic in March 2020, fever and respiratory symptoms were the indications for virus testing in our hospital. As data have continued to accumulate worldwide, gastrointestinal, neurological, cardiovascular, cutaneous and ocular symptoms have been reported for confirmed COVID-19 cases. There have been few case reports on problems with taste and smell in paediatric COVID-19. However, new symptoms can provide diagnostic and testing criteria for patients with no other clinical presentation, especially in older children. **Conclusion.**

This paper looks at the taste and smell problems reported in paediatric patients and shares insights from our hospital.

Key words: COVID-19, fever, pandemic, smell, taste.

At the beginning of the COVID-19 pandemic in March 2020, fever, cough and symptoms associated with the respiratory system were the indications for virus testing at our University hospital in Istanbul, Turkey. Very mild symptoms or unusual presentations were missed. As data have continued to accumulate worldwide, gastrointestinal, neurological, cardiovascular, cutaneous, ocular symptoms have been reported for confirmed COVID-19 cases.

The Turkish Republic Ministry of Health reacted to the pandemic by adopting a standardised country-wide approach and establishing a Scientific Committee for COVID-19. Guidelines and algorithms have been constantly revised as new information has emerged (1). As a result, loss of taste and smell were added to the adult guidelines as a criteria for diagnosing possible cases on 30 May (1). This paper looks at the taste and smell problems reported in paediatric patients. These symptoms can present in four different ways. Anosmia is a total loss of smell and hyposmia is a partial loss of smell, while ageusia is a total loss of taste and dysgeusia is when tastes are distorted. At the time of writing we were not aware of any paediatric guidelines that specified taste and smell disorders as criteria for testing for the coronavirus that causes COVID-19.

Between 11 March and 15 June our institution tested 145 children for the virus. Nasopharyngeal swabs from suspected cases were transported to the laboratories that had been authorised by the central General Directorate of Public Health Microbiology Reference Laboratory (2). The number of children who tested positive was 27/145 (18.6%) and the most common presenting symptom was fever. There was only one child with a taste-related symptom among these COVID-19 cases and no problems with smell were recorded. This was an 11-year-old girl who presented to our clinic two days after she had lost her sense of taste. Her mother, father and two sisters had all tested positive for the virus. She had no fever, cough, sore throat, headache or any symptoms related to smell. Her vital signs were normal and she was in a good medical condition. The systemic examination was unremarkable. No other laboratory or radiological tests were carried out and no treatment was provided. All of the family members were isolated at home for at least 14 days. During the follow-up period, she was monitored by telephone.

Few case reports on complete loss of smell and changes in taste are available for paediatric COVID-19 patients (3). Most of the reports that have been published on a complete or partial loss of taste or smell have related to adult patients with COVID-19. Giacomelli et al (4) carried out a cross-sectional Italian survey on the prevalence of these disorders in adult patients and found that

20/59 (33.9%) hospitalised patients reported at least one issue with taste or smell and 11/59 (18.6%) reported both. The remaining 39 (66.1%) did not report these symptoms. Females were affected more than males (10/19, 52.6% versus 10/40 25.0%) (4).

Kaye et al (5) carried out an online survey in the USA, the COVID-19 Anosmia Reporting Tool for Clinicians, from 25 March to 3 April 2020 and 237 responses covering patients of all ages were analysed. Loss of smell was the initial symptom in 26.6% of cases and was noted in 73% of patients prior to diagnosis and 27% after diagnosis (5). Only 2% of the data were entered by paediatricians and these related to three patients. There was one patient under five years of age, one aged 5-10 years and one aged 10-15 years (5). Most of the olfactory symptoms in the study were reported by otolaryngologists and normal sensations started to return in a mean of 7.2 days for the cohort as a whole (5). Taste and smell dysfunction lasted between three to 13 days in the three paediatric case reports (3).

The incidence of smell and, or, taste disorders in Chinese, German, French and Italian cohorts with COVID-19 were 32%, 69%, 49% and 33.9%, respectively (4,6). A multi-centre study by Qiu et al (6) looked at 394 patients of all ages in three tertiary hospitals in China and one each in France and Germany. The authors reported the key findings for the 161 cases with positive virus results. They found that only 10/27 (37%) of the paediatric cases aged 6-17 years presented with smell and, or, taste disorders (6). The children with these disorders were 15-17 years of age and six of them were male. No severe or critical clinical presentations were reported and a quarter of the children had no additional symptoms when they presented with COVID-19 (6).

Mannheim et al (7) reported a case series of COVID-19 patients aged 0–17 years from Chicago, USA. They reported that 64 children (1%) tested positive for the virus out of 6369 laboratory confirmed cases of all ages. Cough and fever were the most common symptoms in the paediatric cases. Nasal congestion, rhinorrhea and, or, total loss of smell were present in 19 (30%) children (7). The exact number was not provided for just total loss of smell.

Mak et al (3) reported total loss of smell in three children aged 14, 15 and 17 years, who tested positive for the virus, and two of them also reported changes in taste. They had no fever, cough or shortness of breath. They also reported symptoms such as mild chest discomfort, headache and rhinorrhoea. Two of the patients had no known contact with confirmed COVID-19 cases, but one who had flown recently had been informed about a confirmed case on the same flight as her (3).

Another study reported that a 17-year-old girl with beta-thalassaemia, who tested positive for the virus, presented with a total loss of smell and taste for eight days. She had also been sneezing for two days. Her father had also tested positive for the virus (8).

Taste and smell disorders have mostly been self-reported. Surveys such as The Questionnaire of Olfactory Disorders, the COVID-19 Anosmia Reporting Tool for Clinicians and visual analogue scales, were used to quantify smell and taste dysfunction (5,6). In the multi-centre case series by Qui et al (6), 90 COVID-19 patients in Shanghai, China, who had no subjective smell dysfunction, underwent objective olfactory testing. The authors used eugenol, 75% ethanol and vinegar to screen for the presence of subclinical partial loss of smell. Disposable cotton swabs were dipped in each of the three stimuli and placed 1cm to 2cm below the front nostril. The patients were then instructed to smell each swab three times (6). Despite reporting normal subjective olfaction, 10 of the 90 subjects, including one child, demonstrated abnormal chemosensory function during the objective testing (6). Since most of the data on smell and taste dysfunction has come from surveys, we do not have any information on the patients who cannot respond to surveys, such as patients with dementia, language barriers or those on invasive and non-invasive ventilation (4). This is a limitation of such studies.

There have been limited data about the correlation between disease severity and the presence of smell and taste dysfunction in the literature, so we do not know the significance of these symptoms in children with COVID-19. The timing, and the order in which symptoms occur, may vary among patients. Patients may present with smell and taste dysfunction as their only, or their first symptom of COVID-19. These symptoms may precede any fever, cough or other symptoms of COVID-19 or present later in the course of the disease (3,6). The Qui et al (6) multi-centre study measured the incidence of smell and taste dysfunction in COVID-19 patients mild, moderate and severe forms of the disease. The incidence was 53/98 (54%) in mild cases, 40/107 (37%) in moderate cases and 11/63 (17%) in severe cases. Another study by Mak et al (3) showed that taste and smell dysfunction may be transient or persist after other symptoms have resolved.

A report by the American Centers for Disease Control and Prevention listed the most common symptoms experienced by paediatric cases. These were: fever, cough, headache, rhinorrhoea, myalgia, abdominal pain, diarrhoea, a sore throat, nausea and vomiting and shortness of breath (9). A pre-pandemic paper by Gonvalves and Goldstein stated that the most common causes of total

loss of smell were after a virus or because of chronic rhinosinusitis. The authors added that other causes included nasal polyps, head trauma, cilia dysfunction and aging (10). An initial assessment of the COVID-19 Anosmia Report Tool by Kaye et al (5) stated that changes in the sense of taste may be related to losing the sense of smell.

Data are still emerging on the symptoms reported by children with COVID-19 and the literature is constantly being updated. We hope that this will include more data relating to smell and taste symptoms in children with COVID-19. The main problem that we have is that symptoms related to taste and smell are so subjective that it is hard to assess them in paediatric age groups. However, any new onset of symptoms can be used as a diagnostic and testing criteria for patients with no other clinical presentation, especially in older children and adolescents.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

FINANCE

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References

- 1- The Republic of Turkey Ministry of Health Directorate General Of Public Health, COVID-19 (SARS-CoV-2 INFECTION) (Study Of Scientific Board) General Information, Epidemiology and Diagnosis (online). Website: https://hsgm.saglik.gov.tr/depo/covid19/Ingilizce/Rehber/COVID-19_Rehberi__Genel_bilgiler_epidemioloji_ve_tani_8.06.2020_eng.pdf (accessed 2 July 2020)
- 2- Demirbilek Y, Pehlivanürk G, Özgüler ZÖ, Alp Meşe E. COVID-19 outbreak control, example of ministry of health of Turkey. *Turk J Med Sci* 2020;50(SI-1):489-494.
- 3- Mak PQ, Chung KS, Wong JS, Shek CC, Kwan MY. Anosmia and Ageusia: not an Uncommon Presentation of Covid-19 Infection in Children And Adolescents. *Pediatr Infect Dis J* 2020;10.1097/INF.0000000000002718.
- 4- Giacomelli A, Pezzati L, Conti F, Bernacchia D, Siano M, Oreni L, et al. Self-reported olfactory and taste disorders in SARS-CoV-2 patients: a cross-sectional study. *Clin Infect Dis* 2020;26:ciaa330.

- Accepted Article
- 5- Kaye R, Chang CWD, Kazahaya K, Brereton J, Denny JC 3rd. COVID-19 Anosmia Reporting Tool: Initial Findings. *Otolaryngol Head Neck Surg* 2020;163:132-134.
 - 6- Qiu C, Cui C, Hautefort C, Haehner A, Zhao J, Yao Q, et al. Olfactory and Gustatory Dysfunction as an Early Identifier of COVID-19 in Adults and Children: An International Multicenter Study. *Otolaryngol Head Neck Surg* 2020:194599820934376.
 - 7- Mannheim J, Gretsche S, Layden JE, Fricchione MJ. Characteristics of Hospitalized Pediatric COVID-19 Cases - Chicago, Illinois, March - April 2020. *J Pediatric Infect Dis Soc* 2020;piaa070.
 - 8- Marhaeni W, Wijaya AB, Kusumaningtyas P, Mapianto RS. Thalassemic Child Presenting with Anosmia due to COVID-19. *Indian J Pediatr* 2020;1.
 - 9- CDC COVID-19 Response Team. Coronavirus Disease 2019 in Children - United States, February 12-April 2, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69(14):422-426.
 - 10- Goncalves S, Goldstein BJ. Pathophysiology of olfactory disorders and potential treatment strategies. *Curr Otorhinolaryngol Rep* 2016;4:115–121.